

the Atom

Los Alamos Scientific Laboratory
July-August, 1977

the Atom

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FRONT AND BACK COVERS

Bill Jack Rodgers took the front and back covers for this issue, which features many pictures of the environment of the Los Alamos area and activities within the new National Environmental Research Park (NERP). The front cover picture shows terrain from the Rio Grande to the top of the Jemez Mountains, and the varied land and vegetation forms to be studied within the broad boundaries of the NERP. The back cover photo shows the beautiful and awesome colors of a tragic event, the La Mesa forest fire. The lights of Santa Fe are seen at the extreme left edge of the photo.

INSIDE BACK COVER

Fireworks still are part of Fourth of July celebrations. Bill Jack caught on film this spectacular burst of aerial fireworks over Los Alamos.



No matter which way you look, the Los Alamos area is beautiful.

The Environment

Throw together a major river, rolling hills, rugged canyons, tree-covered mesas and plateaus, and beautiful forested mountains, all within a distance of a few miles and within a several thousand foot rapid rise in elevation, and you have the environment of Los Alamos Scientific Laboratory.

It is a beautiful place, this part of North Central New Mexico, and

it provides scientists an unequalled environmental research laboratory.

Almost all of the major, defined life zones in the United States are found in the few miles from the Rio Grande to the top of the Jemez Mountains. Los Alamos County, the city of Los Alamos and LASL are perched in the middle of this fascinating terrain.

This concentration of ecological

systems was a major reason why the Los Alamos area was designated a National Environmental Research Park (NERP) by the Energy Research and Development Administration.

But while scientific research in and around the buildings of LASL sometimes is quite visible, research in the NERP will be less noticeable. Deep in the many canyons of

The Los Alamos National Environmental Research Park

In November, 1976, the Los Alamos Scientific Laboratory and its adjacent lands, encompassing about 27,500 acres, were designated as a National Environmental Research Park by the U.S. Energy Research and Development Administration (ERDA).

The designation of National Environmental Research Parks (NERPs) is based on the "legacy of parks" initiated by President Richard Nixon's 1971 State of the Union Message and on subsequent presidential endorsements. The Los Alamos NERP is one of 4 such parks in the United States.

The ultimate goal of environmental research at the LA/NERP is to contribute understanding of how man can best live in balance with nature, while enjoying the benefits of technology. LASL has major nuclear and chemical facilities that could provide stresses on the adjacent environment. These stresses require an integrated scientific approach for proper evaluation of their environmental significance and mitigation of possible effects.

Fulfillment of the environmental study programs requires the continuous cooperation of the scientific disciplines of biology, ecology, geology, hydrology, meteorology, computer sciences, analytical chemistry, and electronics.

Because access to ERDA lands is controlled, environmental research projects can be carried out with a minimum of interference. Cooperative studies with outside scientists, on a wide range of environmental research topics, are encouraged. Facilities are available for research projects by students and staff members from other institutions.

In the narrow view, environmental studies at the Los Alamos NERP assess the environmental impact of Laboratory operations. In a broader scope, these studies describe and evaluate ecological, meteorological, and geophysical processes stemming from man's technological activities, which have significant value for assessing future technological developments.

Current Los Alamos NERP environmental research projects include:


- Environmental inventory of soils, flora, and fauna.
- A material inventory, in the soils and biota, of trace contaminants from treated liquid waste disposal areas to document amounts, routes, and rates of transport.
- A study of the kinetics of various radionuclides in honeybee colonies.
- Determination of the downstream transport, because of precipitation and storm runoff, of trace materials in stream channel alluvium.
- Laboratory and field studies of biotic uptake of trace elements from energy technologies.
- Seismographic, stratigraphic, and geologic characterization of the environs.
- A study to determine atmospheric transport and dispersion of contaminants in a complex terrain.
- Characterization of area climatology.

the Pajarito Plateau, scientists will be studying large and small animals, vegetation, soils, geology, and all things related to them that form the whole environment.

As residents of Los Alamos County and visitors to the area drive across the Pajarito Plateau and descend to the Rio Grande valley, or climb into the Jemez, researchers will be working almost within a stone's throw of the passersby. They will be digging into the past, into one of the hundreds of prehistoric Indian pueblo ruins on the plateau.

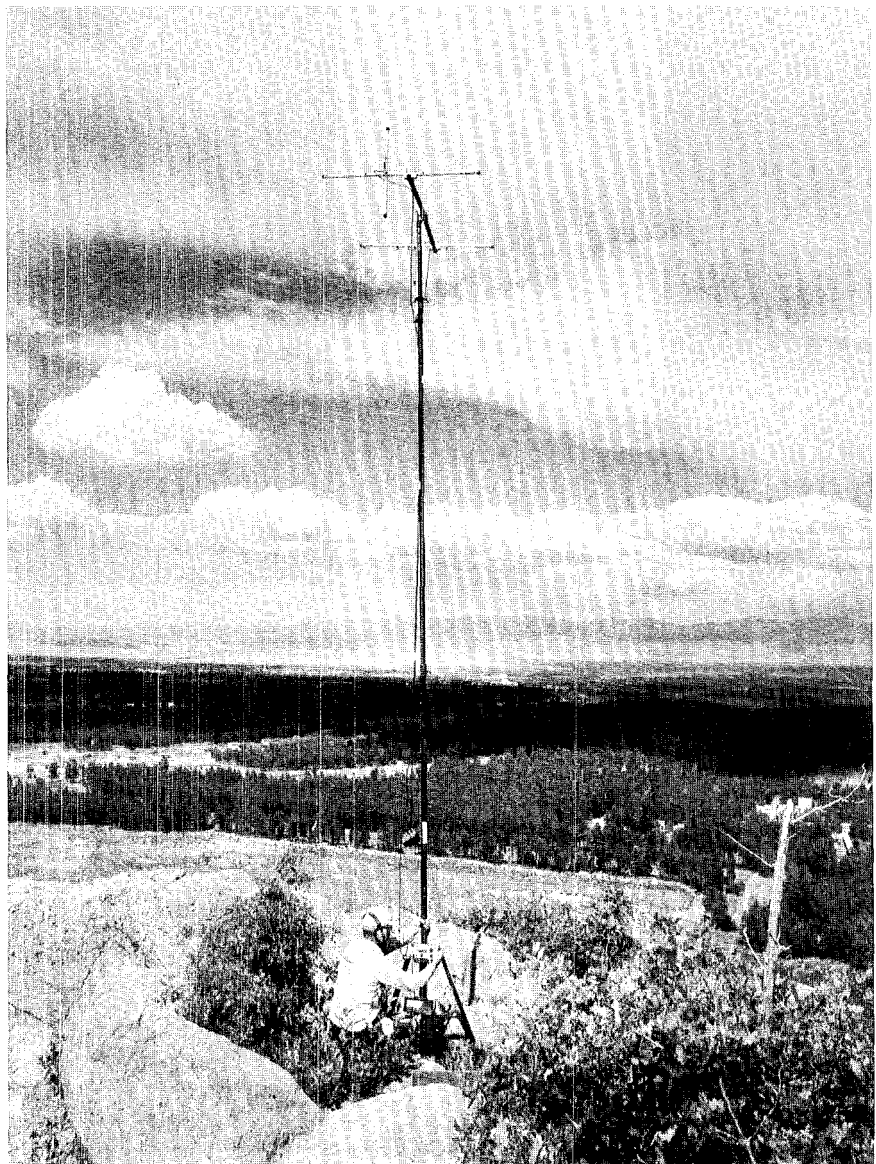
There will be people studying the weather, too. The immense storm clouds that form over the Jemez and send rain or snow to the earth will be the subject of much research.

The opportunity for and variety of research within the NERP is virtually limitless.

The Los Alamos National Environmental Research Park will be officially dedicated at a ceremony at 11 a.m. August 16 at LASL's Occupational Health Laboratory. Several speakers, including U.S. Senator Pete Domenici of New Mexico, are expected to participate in the activities. 

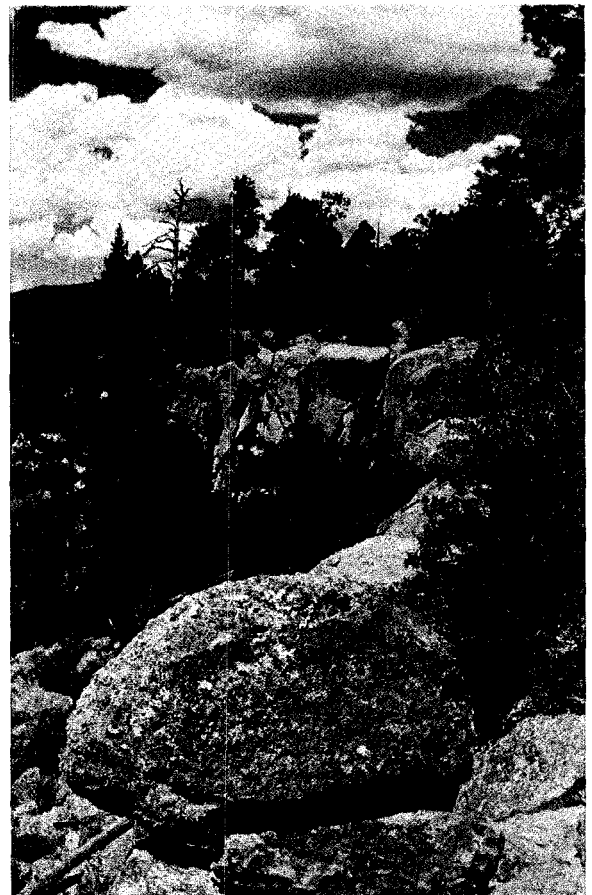
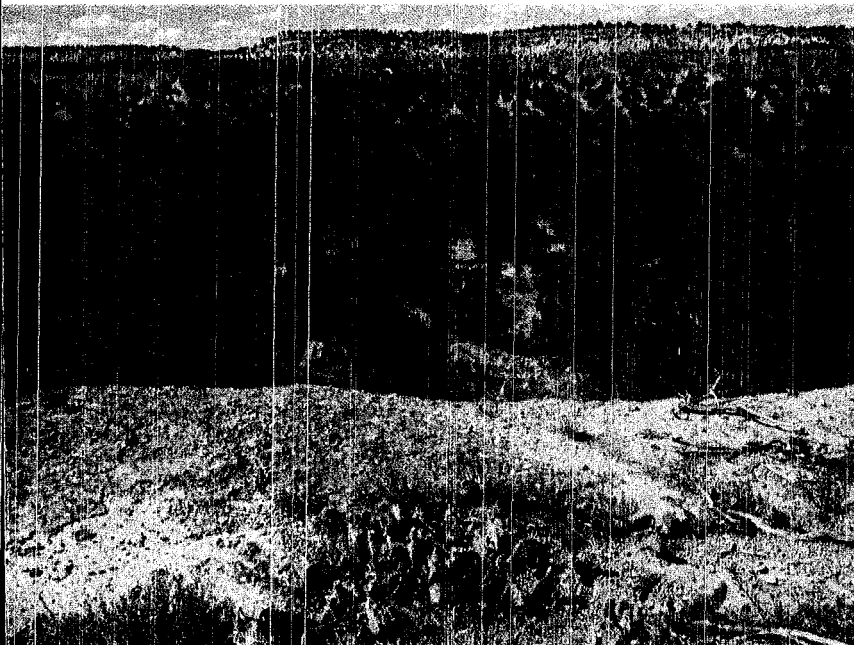
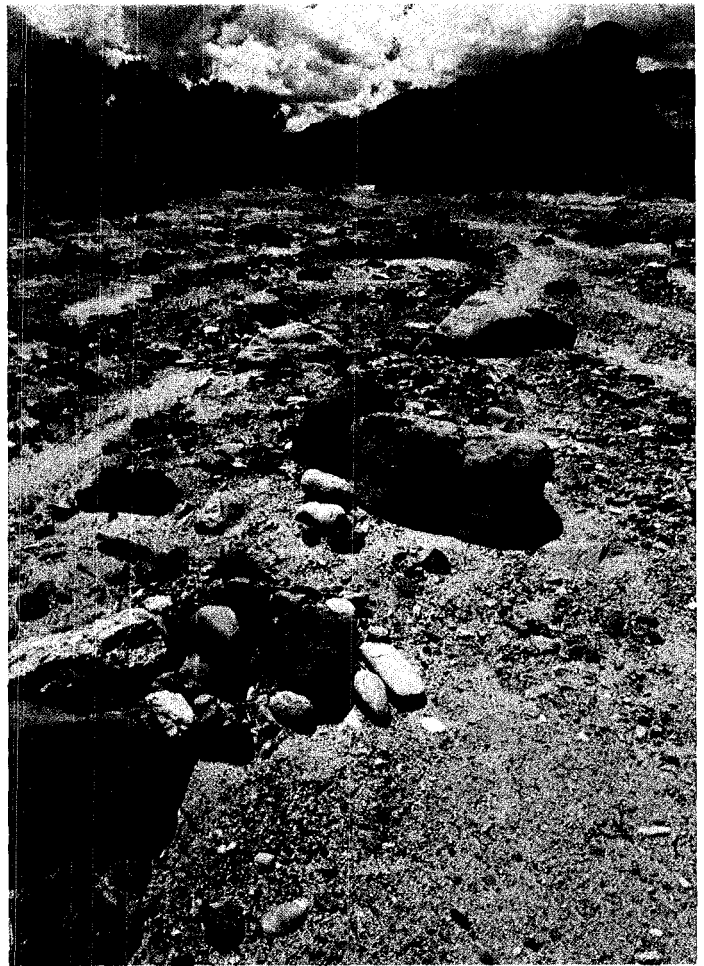
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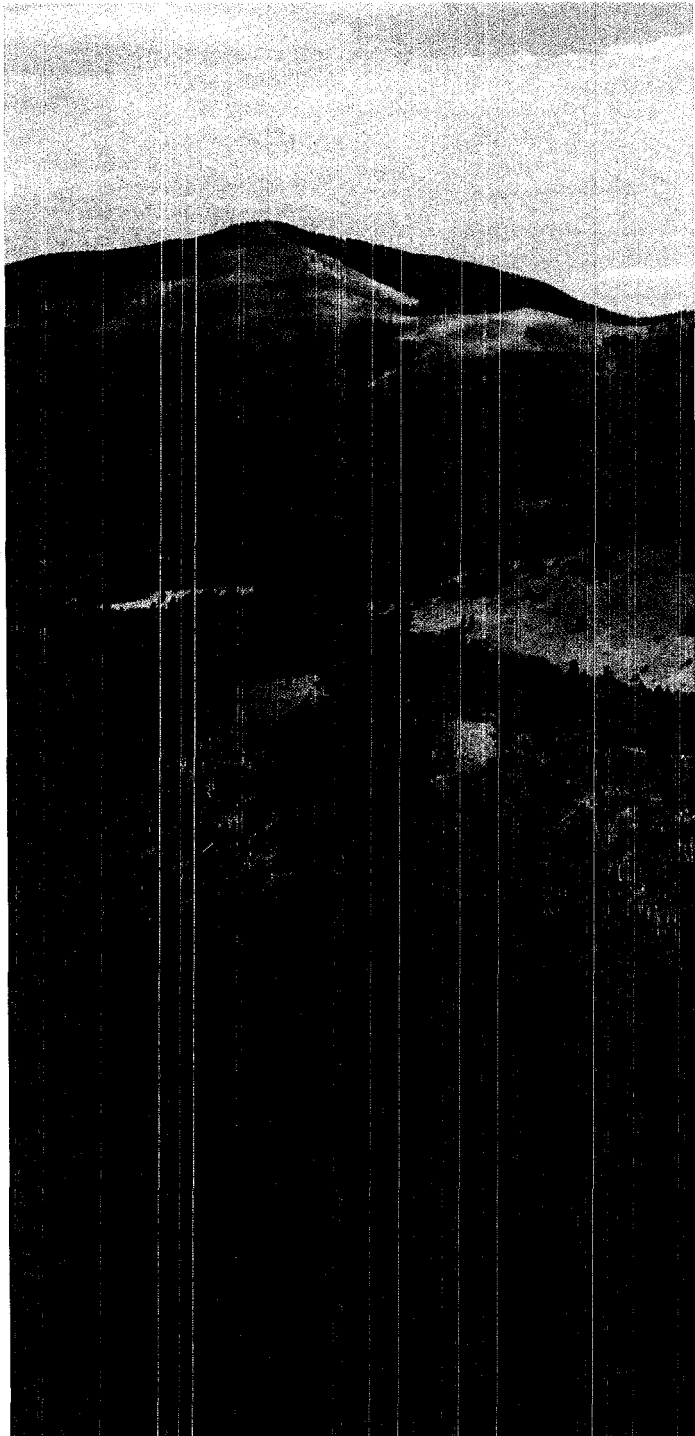
Collars containing small radio transmitters are placed on deer within LASL boundaries, and the transmissions are picked up by antennas such as this one.



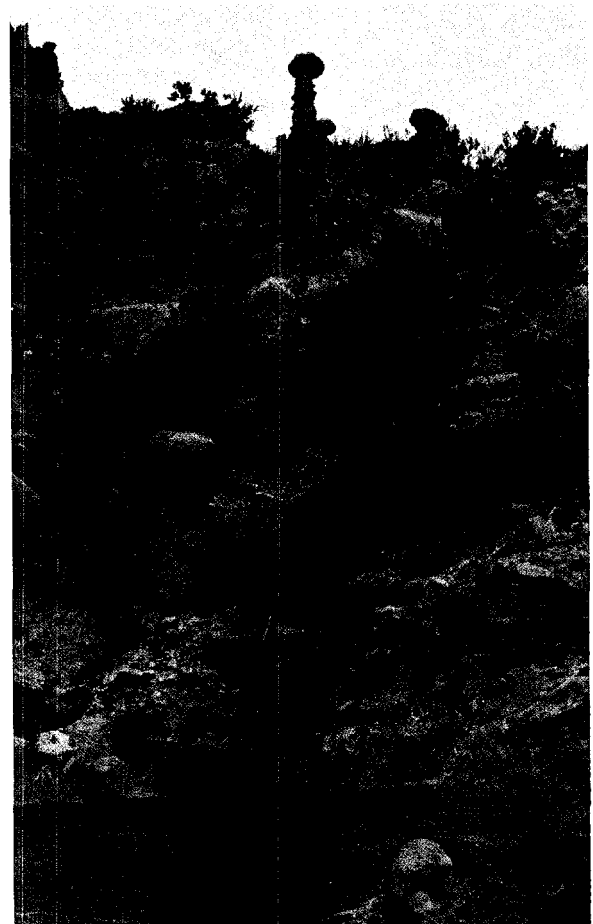
From River To Mountain...

A fascinating aspect of the Los Alamos environment is the rapidly changing terrain. In a few miles the elevation increases several thousand feet. There is an intriguing transition from the brown, rocky, and semi-arid Rio Grande (right photo) to the green and cool Jemez Mountain meadows (first photo on following page). The transition includes the rolling and sparsely vegetated hills above the Rio Grande (bottom left photo) and the thicker vegetation of the Pajarito Plateau (bottom right).





Tent rocks in Guaje Canyon are an interesting feature, geologically as well as scenically, of the Pajarito Plateau canyon areas of the local environment.





Among the many experiments and projects underway within NERP boundaries is research into plants grown in soil containing radioactive elements.

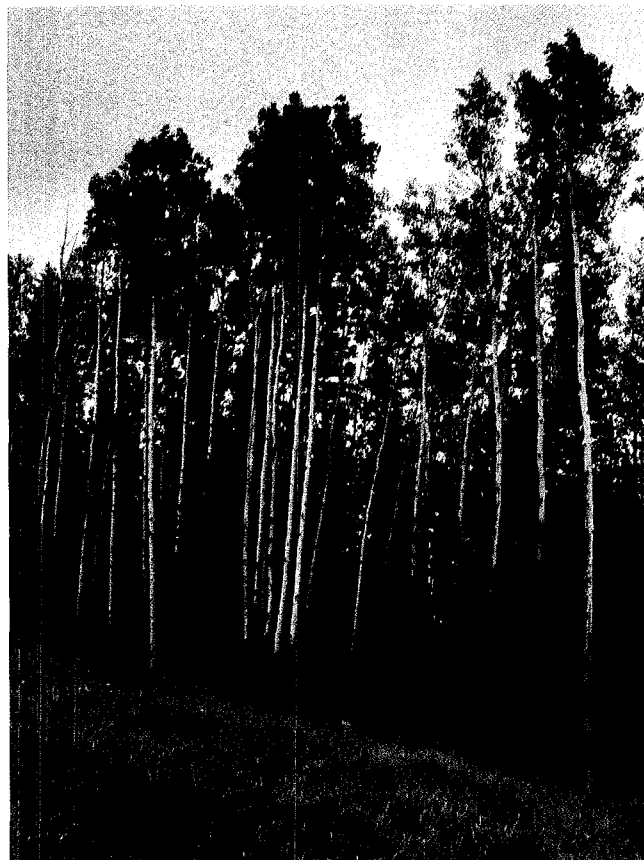


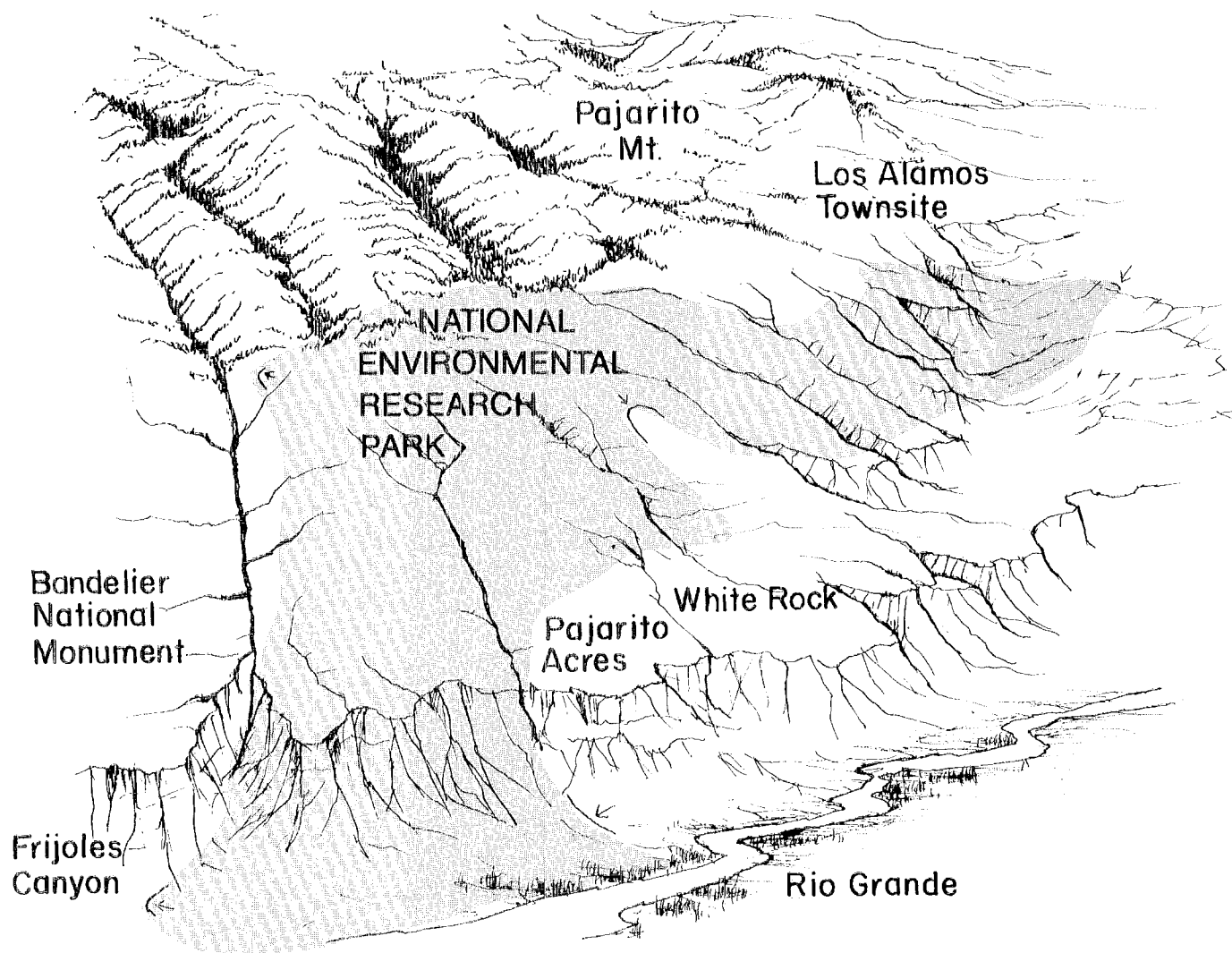
New Research,
Continued Research,
Into The New
And The Old

Archaeological research and excavations are a continuing effort of personnel in LASL's Group H-8. Hundreds of prehistoric Indian pueblo sites have been documented in the Los Alamos area, and many have been excavated or are scheduled for excavation.



Some areas of Los Alamos Scientific Laboratory are visible from the slopes of the Jemez Mountains (photo above), and the grove of aspens is a familiar site in the high mountain meadows.





On this page and the 3 following pages are photographs of personnel in LASL's Group H-8 demonstrating current (and continuing) research activities within boundaries of the Los Alamos National Environmental Research Park.



Seismograph equipment is used to determine makeup of rock beneath the surface.



Soil samples are taken and undergo a variety of tests.

Small mammals are trapped, weighed, tagged, and released. If recaptured they provide information on their feeding habits, range of travel, and habitat.



Vegetation of the area is studied carefully.

A LASL geologist checks the angle of rocks to determine if there has been movement of rock formations.



Studying the deer herd on LASL land has been and will continue to be an interesting part of Group H-8's environmental research. In this photo a radio collar and ear tag are attached to a deer.



A road twists from the Rio Grande to the plateau.

A Tragic Fire, And An Opportunity For Research

A fire that destroys thousands of acres of forest and other plant and small animal life is tragic.

The La Mesa fire in mid-June was such a fire. It burned about 10,000 acres of Bandelier National Monument, 2,500 acres of Forest Service land, and 2,500 acres of ERDA land. Some of the ERDA land will be set aside by LASL to observe how nature, unaided by man, replenishes itself after a disaster such as a forest fire.

LASL's Group H-8, which is responsible for directing activities within the National Environmental Research Park, also will conduct research in the fire-scorched area. *

The La Mesa fire minutes before it jumped State Road 4.





Planes flew over the fire to discharge chemicals in an attempt to extinguish or control the flames. In the bottom photo burned areas within the Bandelier National Monument show up as seemingly small black patches. These black patches and others not shown add up to more than 15,000 acres of scorched trees.



short subjects

A groundbreaking ceremony for LASL's high-energy gas laser facility, to be constructed at a cost of about \$50 million, is scheduled for 9:30 a.m. August 16 near the Laser Division Office.

J. Leon Shohet, a consultant to LASL, has received the 1977 Frederick Emmons Terman award from the American Society for Engineering Education (ASEE). The award was presented to Shohet, who also is professor of electrical and computer engineering at the University of Wisconsin in Madison, in recognition of his "singular accomplishments in research, education and service. . . ."

Kaye D. Lathrop, alternate division leader of LASL's Energy (Q) Division, has been named treasurer of the American Nuclear Society. The 12,000-member society is a nonprofit professional organization composed of scientists, engineers, educators, and administrators who are primarily concerned with the development of nuclear power and who are engaged in other energy-related activities.

Julio J. Garcia, section leader in WX-3, was elected president of the Board of Regents of the New Mexico School for the Deaf at the April meeting of the board. Garcia has been a member of the Board of Regents since 1969 and has served as treasurer and vice president.

Jim Archer, CMB-6, recently took his Class A fuel dragster to Bowling Green, Kentucky and came home with first place honors in the National Hot Rod Association Sports National drag races. This was Archer's first victory in national competition and the first time any drag racer from New Mexico has won first in a national event. His winning time was 6.89 seconds at 198.6 miles per hour in the quarter-mile run.

Paul Kintzinger, Q-21, was promoted from commander to captain in the Naval Reserve during a recent 2-week tour of active duty. Kintzinger has worked on various aspects of the Navy's geothermal program.

Prints of LASL black-and-white and color photographs for personal use may now be purchased from Dan Elliott's Los Alamos Photo Shop, 1731 Central Avenue, telephone 662-2523. Orders for prints must be placed directly with the Photo Shop and must include a brief description of the photograph and the negative number. Catalogs containing selected photographs (with their negative numbers) and price lists are available at the circulation desk of the main LASL Library. The negative numbers of other LASL photographs, including those on display throughout the Laboratory, can usually be supplied by ISD-7, 5123.

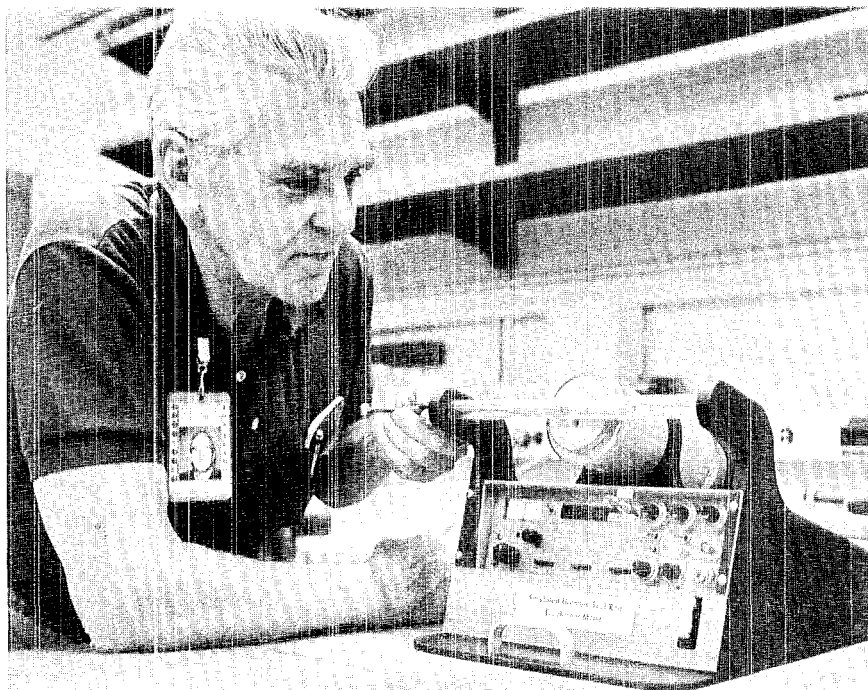
A Software Documentation Group, C-2, was formed effective June 1 with **Ray Davenport** as group leader. The purpose of the group will be generation and supply of documentation for users of CCF systems.

Joseph F. B. Szoo has been appointed head of the Shop Department at LASL. He succeeded Francis E. Stack who retired July 31. A native of Saskatchewan, Canada, Szoo has lived most of his life in the New York area. He is a graduate of New York's Ben Franklin High School and of the Voorhees Technical Institute in New York City. He earned his B.E. degree in mechanical engineering from New York University.

Retirements: **Alan E. Florin**, CNC-2, staff member; **Earl W. Fullman**, J-16, staff member; **Beatrice H. Johnson**, ISD-7, litho plate maker; **Ogden S. Johnson**, H-4, staff member; **Flora K. McCracken**, DIR-FMO, budget administrator; **Francis K. Tallmadge**, P-DO, staff member; **Patricia M. LaBauve**, H-4, staff member; **Arthur Hemmedinger**, P-3, staff member; **Olus Cox Ramsey**, H-5, tissue technician; **Marjorie A. Johnson**, ISD-4, section leader; **Charles L. Critchfield**, T-9, staff member; **Claude Blatti**, SD-5, foreman; **Benjamin D. Dirks**, ENG-1, staff member; **M. Walter Gilbert**, SD-1, machinist; **Clifton B. Groff**, SD-1, machinist; **Alvin H. Guenther**, CMB-AS, inspector; **Joe H. Herrera**, CMB-AP, storesman; **M. Frances Karr**, P-2, secretary; **Lawrence L. Rice**, J-7, staff member; **Charles W. Van Deveer**, SD-5, machinist; **Joseph D. Jaeger**, SD-1, foreman; **Alfred M. Zerwas**, SD-DO, staff member.

Photo Shorts

Joe Woolsey, Q-1, demonstrates a simulated uranium fuel rod enrichment meter he helped design. The enrichment meter, now marketed commercially, offers an improved method of detecting cracked or damaged fuel rods used in fuel reactors.



Several LASL photographers were honored recently for their contributions to a contest conducted by Industrial Photographers of the Southwest (IPSW). On the back row, left to right, Bob Brewer, ISD-7, won first place and second place for off-the-job color; Henry Ortega, ISD-7, won best of show and first place in on-job color; Dana Schneider, ISD-7, earned third place in the on-job color category, and Frank Berry, ISD-7, won second in off-job color. Henry Johnson, M-1, front row, won first place in the commercial photography category.

Geothermal Steam Well Is Reality

Scientists at the Los Alamos Scientific Laboratory (LASL) have created a man-made geothermal well system 2 miles deep near the Valles Caldera in the Jemez Mountains of New Mexico by producing a fracture system in hot granite. The achievement is a major step in the Energy Research and Development Administration's (ERDA) hot, dry rock geothermal energy program.

During the first week of June, 2 bore holes drilled into the west flank of the Valles Caldera 20 air miles west of Los Alamos were connected to produce a significant flow of water between the 2. The water flashed to steam as it was diverted to a nearby holding pond. Temperatures of 130 degrees C (265 degrees F) were recorded after 20 hours of pumping.

More than 92 per cent of the water injected into one hole is expected to be recovered in the second hole, and this recovery level is anticipated to increase with time. Testing will also show whether the initial heat transfer rate is maintained or decreases with time.

LASL has the only hot, dry-rock geothermal energy field program in the United States. It is based on the concept that man can create a useful geothermal reservoir where nature has not provided natural hydrothermal systems such as hot springs or geysers. Such natural systems are being used in other parts of the world, and commercial generation of electricity has been underway for years at the Geysers in California.

Natural geothermal systems are rare, and the largest reservoir of energy that may be available is the hot, dry rock that composes most of the earth's crust. It has the potential of meeting the world's energy needs for thousands of years, if it can be tapped, with little or no harm to the environment.

LASL's system involves 2 holes drilled almost 2 miles deep that are separated at the surface by about 250 feet. Water under high pressure is used in a hydraulic fracturing process to create a system of cracks in the hot granite bedrock, thus exposing a large heat-exchange surface of rock with a temperature of about 400 degrees F. Cold water is pumped down the hole at 900 to 1000 psi (pounds per square inch) pressure. It circulates through the crack system, is heated, and flows from the second hole. Back pressure is applied to the second hole to keep the water from boiling until pressure is released at the surface.

In an electrical generating system, the heated water would be passed through the primary heat exchanger of a power plant. The hot water, after cooling, would be returned through the primary pressurized-water circulation loop to be reheated in the reservoir. The water in the primary loop would be pressurized to prevent the formation of steam that could cause mineral deposits to precipitate into the system and clog the underground cracks and the plumbing. Another fluid in a secondary loop would be vaporized by exchanging heat with the hot geothermal water. The vapor would be used to drive a conventional turbine to generate electricity.

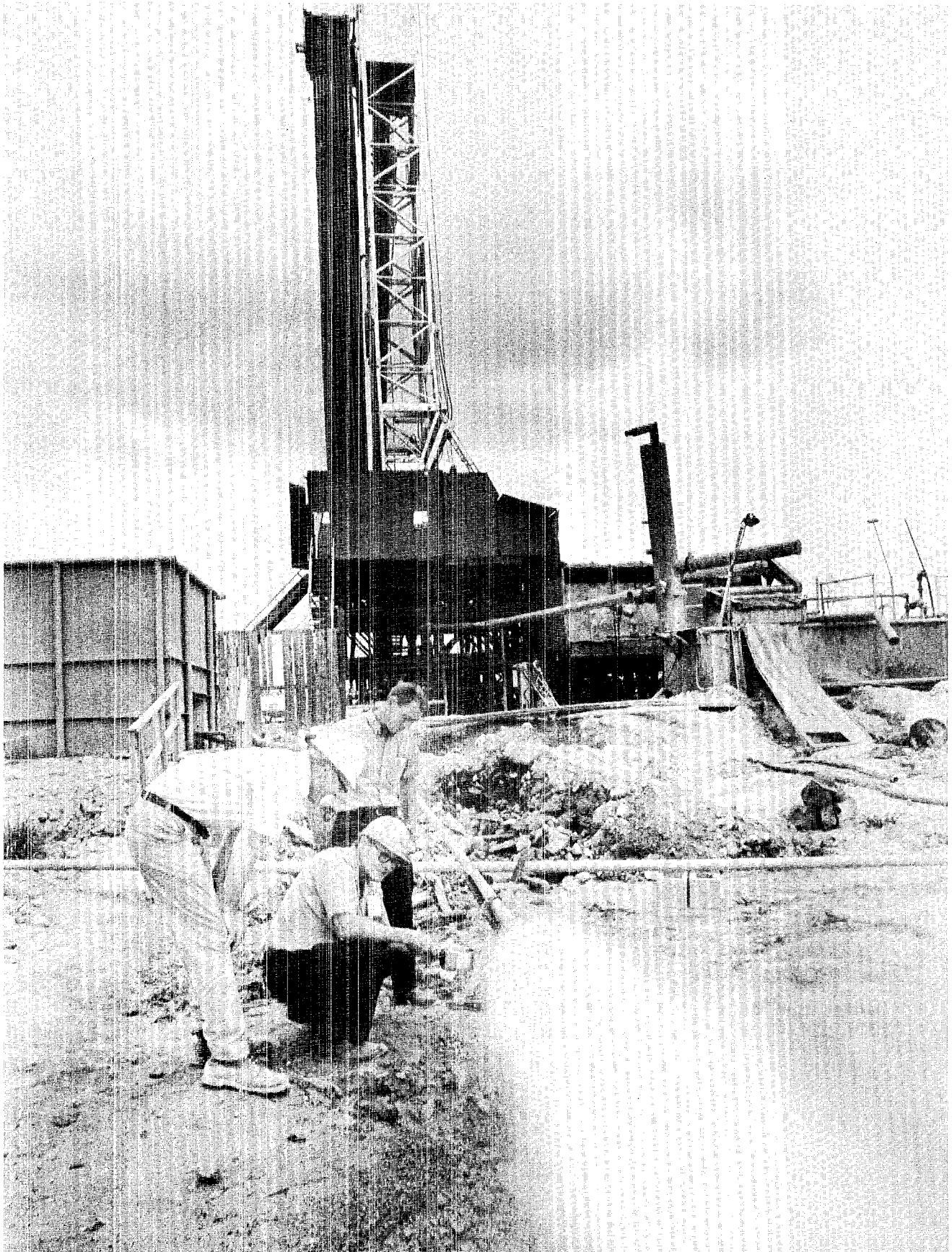
LASL's geothermal energy program was initiated in 1971. The first hole was completed late in 1974, and the second bore hole was completed in 1975.

The next step in the ERDA-funded program is installation of two 10-MWt (megawatt thermal) heat exchangers to study the feasibility of a closed loop pressurized-water system.

By September heat exchangers should be functioning. The system will then be operated for several months to determine whether the circulation temperature decreases and to see what problems might be encountered from precipitation of minerals, mostly silica, into the system.



Taking a sample of water from condensing steam shooting out of the geothermal hot, dry-rock well is Jim Hill, as Bob Potter and Joe Kurtenbach, all of LASL, observe.



LASL Searches For New Symbol

The Laboratory is looking for a new LASL symbol to be used to identify LASL and its programs and publications.

The new symbol must be a strong, clean, simple design that incorporates the letters L A S L, that provides instant identification with the Laboratory, and that reproduces legibly, even at extreme reductions.

Anyone can submit a design in black ink on an 8½- by 11-inch piece of plain white paper to ISD-3, MS-416 by August 22, 1977.

The name, address, and telephone number of the contributor should be shown on the upper right-hand corner of the paper. All submissions will be considered the property of LASL and will not be returned.

Should a submission be selected as the official LASL symbol, there will be no compensation or award to the artist; however, the new symbol, and its designer, would be given wide publicity, including an *Atom* story. ☼

10

years ago in los alamos

CULLED FROM THE JULY-AUGUST, 1967 FILES OF THE ATOM AND
THE LOS ALAMOS MONITOR BY ROBERT Y. PORTON

GOOD OLD DAYS!

ADVERTISEMENT BY LOS ALAMOS SUPERMARKET:
Coffee, 66 cents per pound, chuck roast, 48 cents per pound, milk, 47 cents a half gallon, fryers, 29 cents per pound, flour, 10-pound bag, 88 cents.

FIRE!

Just before dawn this morning the Santa Fe Opera's open air theater near Tesuque caught fire, and the blaze destroyed the stage and all seating facilities. Damage was estimated at close to \$1 million. The opera intends to continue its 1967 schedule in Santa Fe. Officials hope to start a new building fund sometime this year.

DOD MEDAL

The U.S. Defense Department's "Distinguished Public Service Medal" and an accompanying citation signed by Defense Secretary Robert McNamara have been presented to Wright H. Langham, assistant health division leader for biomedical research. The medal was in recognition of Langham's work in connection with the Palomares, Spain, accident in early 1966.

COLD FLOW

Phoebus 2—the most powerful nuclear rocket reactor in the Rover program—has successfully taken its first step on the road to becoming the power source for a manned interplanetary flight. The Los Alamos Scientific Laboratory-designed-and-developed reactor completed its "cold flow" test series at the Nuclear Rocket Development Station at Jackass Flats, Nevada. In a "cold flow" test, experiments are conducted using an assembly identical to the design used in "hot tests" except that the assembly does not contain any fissionable material nor produce a nuclear reaction. Manned missions deep into space using nuclear rockets are coming closer to reality.



PC/P

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